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1992 Feature Article - The Business Cycle in Australia: 1959 to 1992

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Introduction

The ABS is exploring means of providing more useful early signals of movements in economic time series. In particular it is:

- undertaking feasibility studies to collect additional data on businesses' and householders' expectations;
- refining the analysis and interpretation of the expectations data it collects; and
- investigating the leads and lags between economic time series, with a view to developing composite leading indicators of economic activity.

This article is an attempt to date and measure the Australian business cycle. It is the first in a series to be published in the AEI to study the time relationships between the business cycle and the main economic indicators.

Business cycles were given the following definition by Burns and Mitchell from the National Bureau of Economic Research (NBER) of the United States in 1946:

"Business cycles are a type of fluctuation found in the aggregate economic activity of nations that organise their work mainly in business enterprises: a cycle consists of expansions occurring at the same time in many economic activities followed by similar general recessions, contractions and revivals which merge into the expansion phase of the next cycle; this sequence of changes is recurrent but not periodic...".

This definition has been quoted many times and is still appropriate. Monitoring the fluctuations in aggregate economic activity is of crucial importance to decision makers, both in economic policy making and in business activities. Dating the past turning points of the business cycle and measuring the relative sizes of the successive fluctuations permit the study of the time relationships between different economic indicators. The knowledge of these past relationships assists in the detection of current and future turning points. The research of the turning points in economic activity, called cyclical analysis, was pioneered in the early 1930s by Burns and Mitchell. Since then, this approach to economic analysis has been used and developed in many countries, including Australia.

Cyclical analysis has developed its own terminology which is worth detailing in this introduction. The succession of fluctuations in the aggregate economic activity is named the **business cycle**, sometimes the **reference cycle**. The chronology of turning points, which is the dates of the peaks and the troughs delimiting expansions and contractions of the general economic activity, is generally referred to as

the **reference chronology**. A cycle is composed of two phases, an **expansion** and a **contraction** (or **recession**).

Methodology

The objective here is to have the broadest possible measure of aggregate economic activity, so the Burns and Mitchell definition has been applied to the average of the three estimates of constant price gross domestic product (GDP(A)). Some previous analyses of the business cycle, particularly in the United States and Australia, have focused on aggregate general economic activity represented by a cluster of economic indicators. This approach, justified for a monthly analysis or when only poor national accounts data are available, has not been followed here. The present study is focused on a quarterly analysis of the business cycle. GDP(A) is the quarterly series which has the broadest economic coverage possible across industries, economic agents, income, expenditure and output (ABS, 1990). Besides these qualities, GDP(A) has the advantage of being recognised by any user of economic statistics. Quarterly estimates of production-based GDP are only available from September 1974 onwards. Before this date GDP(A) is a weighted average of expenditure and income based GDP.

Another important element of this study is the length of cycles examined. Since the objective of this work is to provide insights into short-term fluctuations in the economy it has been decided to concentrate on cycles with total duration of two to eight years. This choice is consistent with the classical approach to measuring business cycles. Cycles of total duration shorter than two years are more likely to be associated with irregular movements including measurement errors and socio-economic shocks (Zarb, 1992). Fluctuations corresponding to cycles of durations longer than eight years, here known as long-term trend, originate from changes in structural factors such as technology, culture or demography.

Two approaches to cyclical analysis are commonly used. The “growth cycles” method is used by most of the institutions which have worked on business cycles determination (OECD, 1987) and is the method used in this study. The other commonly used method analyses the growth in the seasonally adjusted series. This implies, without any real justification, that the long-term trend is a deterministic function of time.

Using the “growth-cycle” method, time series can be broken down into seasonal and trading-day variations, irregular short-term movements, long-term trend and, finally, the business cycle components. Estimates of these different components are obtained by using filters. The solid line in Chart 1 shows the series of GDP(A) corrected for seasonal, trading day and irregular movements while the dotted line shows its long-term trend. The business cycle is obtained by removing the long-term trend element from the series already corrected for seasonal, trading day and irregular movements (ie. the deviations of the solid line from the dotted line in Chart 1). Chart 2 shows the result of this process: the deviation from the long-term trend of the smoothed GDP(A) from 1960. The vertical lines in Chart 1 and Chart 2 delineate the successive phases discussed below.

CHART 1. GDP(A) AT AVERAGE 1984-85 PRICES

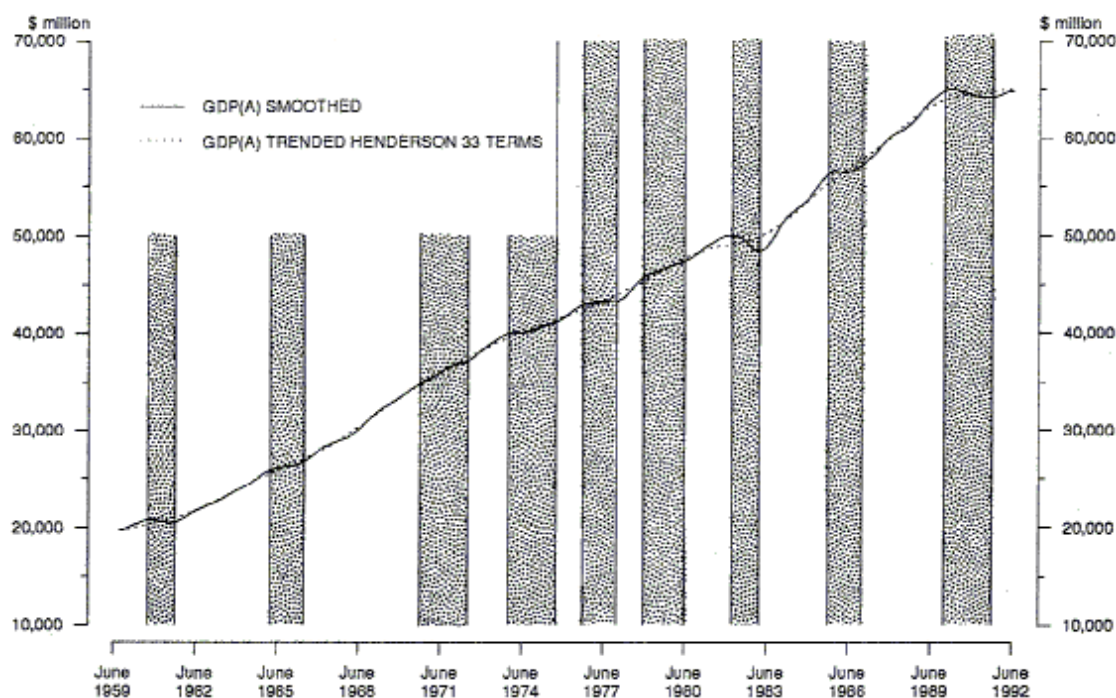
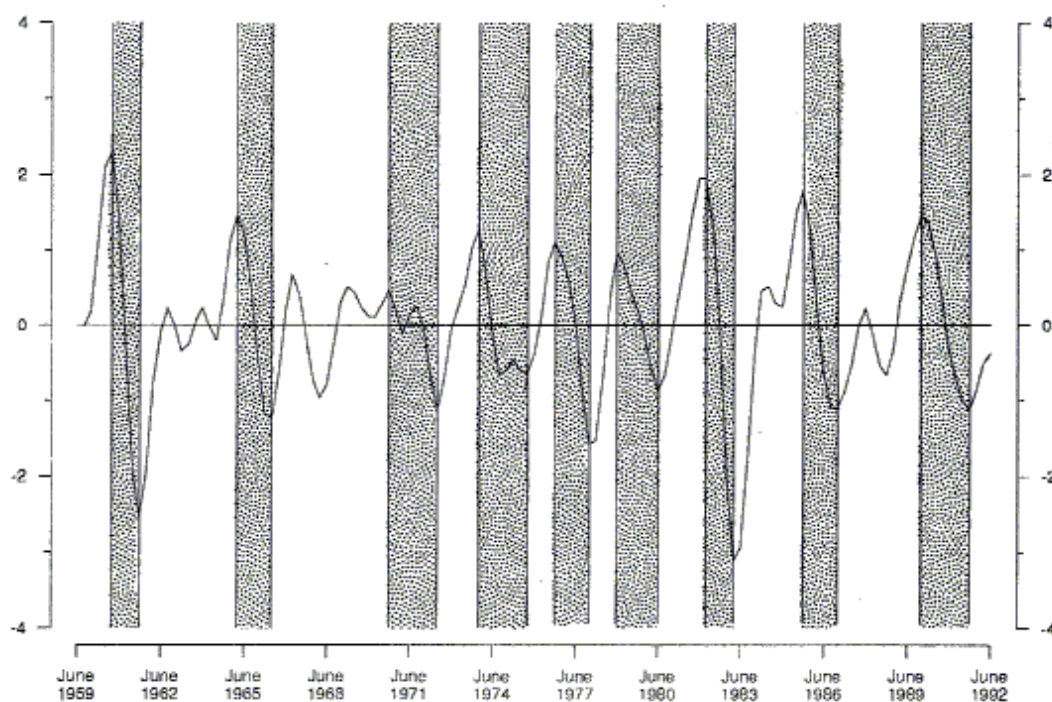


CHART 2. GDP(A) DEVIATION FROM TREND



The filters used in this study to eliminate the irregular and the long-term movements are, respectively, 7 and 33 term Henderson moving averages. When applied to a series corrected for seasonal and trading day movements they retain the fluctuations corresponding to cycles of 7 to 33 quarters length. The loss in terms of timeliness at end-points is minimal and no time-shift is induced. This methodology is also consistent with the general smoothing methods used by the ABS (ABS, 1987). This choice of filter offers the additional advantage of keeping the technique as simple as possible, from both users' and statisticians' points of view.

Using the deviation of smoothed GDP(A) from the long-term trend (Chart 2), turning points are selected visually amongst local minima and maxima. There may be an element of subjective judgement involved in the selection of turning points and two rules of thumb from the "Handbook

of cyclical indicators” of the United States Bureau of Economic Analysis (BEA) are used for ambiguous cases (BEA, 1987). The first rule is that peaks and troughs must alternate. This rule enables the distinction between “double-turns” and full cycles. It also assists with the assessment of the validity of the most recent turning point. A turning point is clearly identified when either the next turning point has been identified or the corresponding phase has an amplitude greater than the smallest clearly recognised phase. The other rule of thumb used here is that the last value is chosen as the turning point in case of equal values.

Results and chronology

Table 1 gives the dates of turning points in the Australian business cycle together with the duration of each phase of cycle, expansions and contractions, and the total duration of each cycle. The relative amplitude of the deviation from the long-term trend at various turning points and the amplitude of each phase and of the total cycle are also presented in Table 1. The amplitude of phase is simply measured by the sum of the absolute levels of amplitudes at each end of the phase. These measures are only meant to compare cycles in this study. The means of the different durations and amplitudes are also presented in Table 1. The last column shows the average annual percentage growth rate of the long-term trend during each cycle.

TABLE 1. THE AUSTRALIAN BUSINESS CYCLES

Dates of turning points		Duration (in quarters)			Amplitudes							Long term trend (%p.a.)
Troughs	Peaks	Troughs	Expansions	Contractions	Total	Troughs	Peaks	Troughs	Expansions	Contractions	Total	
1960	1961 Q3				4		2.3	-2.5			4.8	
1961 Q3	1965 Q3		14	5	19	-2.5	1.5	-1.2	4.0	2.7	6.7	5.4
1966 Q2	1970 Q1		17	7	24	-1.2	0.5	-1.1	1.7	1.6	3.3	5.6
1972 Q2	1973 Q3		6	7	13	-1.1	1.3	-0.6	2.4	1.9	4.3	3.1
1975 Q3	1976 Q4		4	5	9	-0.6	1.1	-1.6	1.7	2.7	4.4	2.6
1977 Q4	1978 Q3		4	6	10	-1.6	1.0	-0.9	2.6	1.9	4.5	3.3
1980 Q2	1982 Q4		7	4	11	-0.9	2.0	-3.1	2.9	5.1	8.0	1.7
1983 Q1	1985 Q1		10	5	15	-3.1	1.8	-1.1	4.9	2.9	7.8	4.0
1986 Q4	1989 Q3	p1991 Q3	12	p7	p19	-1.1	1.5	p-1.1	2.6	p2.6	p5.2	p2.5
	Mean		9	6	15		1.4	-1.5	2.9	2.9	5.5	

p = provisional

Eight full cycles can be identified from 1960 to now, nine contractions and eight expansions, with the dates of the last phase being preliminary. The turning point observed in Q3 1991 might become a trough, in the sense of growth cycle analysis, only when the current phase has reached an amplitude larger than the smallest amplitude of phases observed up to now or when the next peak is reached. Several conclusions can be drawn from Table 1 and Chart 2:

- The last three cycles have much larger amplitudes than the four preceding cycles from the

mid 1960s to 1980.

- Double-turns are present in five of the eight expansions, namely 1962, 1967, 1975, 1984 and 1987. None of these double-turns can be considered as cycles because their amplitudes and lengths are too small compared with the average of clearly recognised phases. The mild cycle observed in 1977 Q4 - 1978 Q4 - 1980 Q2 is large enough to be a cycle on its own but appears as a double-turn in the chronology of non-farm GDP. The double-turns are relatively frequent which reinforces the need for care when identifying the most recent turning point of the period.
- The long-term trend values show the slow-down observed since the beginning of the 1970s, with the exception of the acceleration of the mid 1980s. The average growth rate of the long-term trend during the last cycle was 2.5 per cent per annum.
- The last cycle, 1986 Q4 - 1991 Q3, has the longest duration observed since the early 1970s with a 12 quarter expansion and a 7 quarter contraction. In terms of deviation from trend the last cycle is very similar to the previous one, 1983 Q1 - 1986 Q4. Both cycles started with a "double-turn", more pronounced in the 1986 Q4 - 1989 Q4 expansion than in the previous one. Their contractionary phases have similar amplitudes. The main difference in the two cycles is in the level of the long-term trend which was growing at an average of 4 per cent per year in the first one while growing at 2.5 per cent per year in the second.

Given the nature of the estimation of the business cycle which involves a long-term trend estimate, the amplitude of the most recent phase is provisional. It will be revised until the long-term trend converges towards a more definite value. More data are also needed to confirm the last turning point of the series and the characteristics of the corresponding phase.

Table 2 contains data used for this study for long-term trend, smoothed and percent deviation of the long-term trend of the GDP(A) series.

TABLE 2. GDP(A) AT AVERAGE 1984-85 PRICES, SMOOTHED, LONG-TERM TREND AND DEVIATION FROM TREND

	Smoothed (\$m)	Long-term Trend (\$m)	Deviation (per cent)	Peak, Trough, Contraction or Expansion
1959 Q3	19740	19744	0.0	E
1959 Q4	19906	19871	0.2	E
1960 Q1	20249	20035	1.2	E
1960 Q2	20623	20199	2.1	E
1960 Q3	20840	20370	2.3	P
1960 Q4	20853	20545	1.5	C
1961 Q1	20687	20727	-0.2	C
1961 Q2	20513	20913	-1.9	C
1961 Q3	20571	21107	-2.5	T
1961 Q4	20910	21313	-1.9	E
1962 Q1	21377	21538	-0.8	E
1962 Q2	21775	21790	-0.1	E
1962 Q3	22119	22071	0.2	E
1962 Q4	22379	22382	0.0	E
1963 Q1	22640	22718	-0.3	E
1963 Q2	23015	23073	-0.3	E
1963 Q3	23454	23442	0.1	E
1963 Q4	23869	23816	0.2	E

1964 Q1	24183	24189	0.0	E
1964 Q2	24505	24554	-0.2	E
1964 Q3	24994	24907	0.4	E
1964 Q4	25529	25246	1.1	E
1965 Q1	25943	25572	1.5	P
1965 Q2	26204	25886	1.2	C
1965 Q3	26322	26193	0.5	C
1965 Q4	26374	26497	-0.5	C
1966 Q1	26493	26804	-1.2	C
1966 Q2	26786	27119	-1.2	T
1966 Q3	27262	27445	-0.7	E
1966 Q4	27840	27788	0.2	E
1967 Q1	28343	28154	0.7	E
1967 Q2	28657	28544	0.4	E
1967 Q3	28912	28961	-0.2	E
1967 Q4	29192	29404	-0.7	E
1968 Q1	29581	29870	-1.0	E
1968 Q2	30122	30357	-0.8	E
1968 Q3	30787	30860	-0.2	E
1968 Q4	31467	31373	0.3	E
1969 Q1	32050	31889	0.5	E
1969 Q2	32541	32400	0.4	E
1989 Q3	32977	32902	0.2	E
1969 Q4	33430	33392	0.1	E
1970 Q1	33903	33865	0.1	E
1970 Q2	34423	34323	0.3	E
1970 Q3	34933	34768	0.5	P
1970 Q4	35268	35199	0.2	C
1971 Q1	35574	35618	-0.1	C
1971 Q2	36077	36027	0.1	C
1971 Q2	36520	36428	0.3	C
1971 Q4	36820	36823	0.0	C
1972 Q1	36969	37212	-0.7	C
1972 Q2	37163	37594	-1.1	T
1972 Q3	37697	37965	-0.7	E
1972 Q4	38301	38323	-0.1	E
1973 Q1	38752	38665	0.2	E
1973 Q2	39207	38992	0.6	E
1973 Q3	39712	39303	1.0	E
1973 Q4	40109	39603	1.3	P
1974 Q1	40191	39893	0.7	C
1974 Q2	40110	40175	-0.2	C
1974 Q3	40182	40448	-0.7	C
1974 Q4	40469	40712	-0.6	C
1975 Q1	40781	40967	-0.5	C
1975 Q2	40964	41214	-0.6	C
1975 Q3	41193	41458	-0.6	T
1975 Q4	41531	41699	-0.4	E
1976 Q1	41983	41943	0.1	E
1976 Q2	42548	42196	0.8	E
1976 Q3	42932	42460	1.1	P
1978 Q4	43131	42736	0.9	C
1977 Q1	43292	43024	0.6	C
1977 Q2	43321	43322	0.0	C
1977 Q3	43255	43631	-0.9	C
1977 Q4	43260	43948	-1.6	1
1978 Q1	43598	44273	-1.5	E
1978 Q2	44309	44609	-0.7	E
1978 Q3	45125	44959	0.4	E
1978 Q4	45765	45327	1.0	P
1979 Q1	46085	45713	0.8	C
1979 Q2	46322	46117	0.4	C
1979 Q3	46624	46532	0.2	C
1979 Q4	46891	46947	-0.1	C
1980 Q1	47073	47345	-0.6	C
1980 Q2	47300	47715	-0.9	T
1980 Q3	47725	48042	-0.7	E

1980 Q4	48264	48322	-0.1	E
1981 Q1	48737	48553	0.4	E
1981 Q2	49194	48740	0.9	E
1981 Q3	49623	48890	1.5	E
1981 Q4	49980	49018	2.0	E
1982 Q1	50103	49139	2.0	P
1982 Q2	49903	49273	1.3	C
1982 Q3	49391	49437	-0.1	C
1982 Q4	48683	49647	-1.9	C
1983 Q1	48361	49915	-3.1	T
1983 Q2	48773	50249	-2.9	E
1983 Q3	49750	50654	-1.8	E
1983 Q4	50924	51125	-0.4	E
1984 Q1	51895	51654	0.5	E
1984 Q2	52501	52232	0.5	E
1984 Q3	53001	52844	0.3	E
1984 Q4	53606	53473	0.2	E
1985 Q1	54515	54102	0.8	E
1985 Q2	55548	54714	1.5	E
1985 Q3	56300	55298	1.8	P
1985 Q4	56556	55847	1.3	C
1986 Q1	58490	56360	0.2	C
1986 Q2	56462	56844	-0.7	C
1986 Q3	56690	57315	-1.1	C
1986 Q4	57154	57788	-1.1	T
1987 Q1	57765	58281	-0.9	E
1987 Q2	58495	58803	-0.5	E
1987 Q3	59352	59360	0.0	E
1987 Q4	60083	59946	0.2	E
1988 Q1	60494	60552	-0.1	E
1988 Q2	60842	61161	-0.5	E
1988 Q3	61344	61757	-0.7	E
1988 Q4	62112	62316	-0.3	E
1989 Q1	63024	62823	0.3	E
1989 Q2	63764	63263	0.8	E
1989 Q3	64367	63628	1.2	E
1989 Q4	64849	63915	1.5	P
1990 Q1	65030	64136	1.4	C
1990 Q2	64929	64308	1.0	C
1990 Q3	64656	64447	0.3	C
1990 Q4	64373	64565	-0.3	C
1990 Q1	64218	64670	-0.7	C
1991 Q2	64119	64765	-1.0	C
1991 Q3	64128	64852	-1.1	T
1991 Q4	64367	64931	-0.9	E
1992 Q1	64667	65003	-0.5	E
1992 Q2	64818	65060	-0.4	E

P = Peak, T = Trough, C = Contraction, E = Expansion

Conclusion

This article provides a dating of turning points of the Australian business cycle up to 1992 Q2, with the last turning point still being provisional. This chronology is used for the analysis of the time relationships of the cycles in individual economic indicators with those of general economic activity. The determination of leading and coincident indicators is derived from this work using the same techniques of filtering. The chronology of turning points in general economic activity can also be useful for analysing the behaviour of economic variables in the different phases of the business cycle.

This feature article was contributed by Gerard Salou and Cynthia Kim. Gerard Salou, of the OECD Statistics Directorate, was on a temporary assignment with the ABS. Cynthia Kim was an ABS

officer.

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